Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Cancelled)

2. (Currently Amended) ~~In-situ~~An in-situ testing method for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes ~~according to claim 1, which is characterized by~~, comprising the steps of applying ~~the~~ cyclic loading alternatively to ~~the~~ multiple zones located along the bore-hole axis~~, and hence applying the~~ to thereby apply cyclically alternating shear loading at ~~the~~a central soil layer located between ~~the~~ two adjacent loaded zones, and monitoring displacements of a bore-hole wall during application of the cyclic loading imposed on the bore-hole wall at a given testing soil layer.

3. (Currently Amended) ~~In-situ~~The in-situ testing method ~~for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes~~ according to claim 2, which is aimed at deriving ~~the~~ strength by applying ~~the~~ static loading to the central soil layer after the cyclic loading imposed on the same soil layer.

4. (Currently Amended) ~~In-situ~~An in-situ testing method for the evaluation of liquefaction and dynamic characteristics of soils using ~~bore-hole according to claim 1~~bore-holes, which is aimed at inferring ~~the~~ dynamic characteristics of soils from ~~the~~ relations among ~~the~~ amplitudes of cyclic loading, number of cycles and displacements, during the conduct of application of ~~the~~ cyclic loading imposed alternatively on a single zone located along the bore-hole axis~~, and hence applying the~~ to thereby apply cyclically alternating shear loading at ~~the~~a central soil layer located between ~~the~~ two adjacent loaded zones, wherein displacements of a bore-hole wall during application

of the cyclic loading imposed on the bore-hole wall are monitored at a given testing soil layer.

5. (Currently Amended) ~~In-situ~~The in-situ testing method ~~for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes~~ according to claim ~~1~~4, ~~which is characterized by~~wherein the ~~conduct of~~ cyclic loading ~~using~~uses one or ~~some~~ combinations of three loading types~~, i.e.~~: (i) compressional loading imposed orthogonal to the bore-hole axis, (ii) torsional loading imposed around the bore-hole axis, and (iii) shear loading imposed parallel to the bore-hole axis.

6. (Cancelled)

7. (Currently Amended) ~~In-situ~~An in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes, ~~according to claim 6~~comprising a monitoring zonde that is lowered down into the bore-hole and applies pressure to the bore-hole wall via a pressure-transmitting medium, a pressure controlling unit that can change the pressure carried by the medium in the monitoring zonde periodically, and a monitoring unit for monitoring displacement of the bore-hole wall, ~~in which~~wherein the monitoring zonde ~~is composed of~~comprises multiple cells located along the bore-hole axis that can apply ~~the~~ pressure to the bore-hole wall, and the pressure controlling unit can apply the cyclic pressure alternatively to these multiple cells.

8. (Currently Amended) ~~In-situ~~The in-situ testing apparatus ~~for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes~~ according to claim 7, ~~in which~~wherein the pressure controlling unit can apply ~~the~~ cyclic pressures alternatively to the top and bottom cells and can apply ~~the~~ static pressure to the central cell.

9. (Currently Amended) ~~In-situ~~An in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes, ~~according to claim 6~~comprising a monitoring zonde that is lowered down into the bore-hole and applies pressure to the bore-hole wall via a pressure-transmitting medium, a pressure controlling unit that can change the pressure carried by the medium in the monitoring zonde periodically, a monitoring unit for monitoring displacement of the bore-hole wall, ~~which is equipped with the~~a torque generating unit that can apply ~~the~~ cyclic loading around the bore-hole axis with the monitoring cell intimately attached to the bore-hole wall, and ~~the~~a monitoring unit for ~~the~~monitoring rotational displacements generated by the torsional cyclic loading.

10. (Currently Amended) ~~In-itu~~The in-situ testing method ~~for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes~~ according to claim ~~6~~9, ~~which is equipped with the~~further comprising a shear load-generating unit that can apply ~~the~~ cyclic loading parallel to the bore-hole axis with the monitoring cell intimately attached to the bore-hole wall, and ~~the~~a monitoring unit for ~~the~~monitoring shear (axial) displacements generated by the cyclic shear loading.

11. (Currently Amended) ~~In-situ~~An in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes, ~~having~~comprising a monitoring zonde lowered down into the bore-hole, the monitoring ~~zoned is composed of~~zonde comprising multiple cells that have independent pressure rooms, and each independent cell is designed to apply ~~the~~a loading to the corresponding soil layer by controlling the pressure carried by ~~the~~a liquid medium in the pressure room, ~~and~~wherein a central cell of the multiple cells ~~can apply the~~applies a static loading~~,~~ and top and bottom cells ~~that can~~ apply ~~the~~ cyclic loading to ~~the~~ corresponding soil layers, ~~the~~said monitoring zonde further comprising top and bottom guard cells ~~are~~ provided on top of all the cells and beneath all of the cells, respectively.

12. (Currently Amended) ~~In-situ~~The in-situ testing apparatus ~~for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes~~ according to claim 11, ~~which is equipped with~~further comprising a pore water pressure gauge located at the central cell of the monitoring ~~cell~~zonde.

13. (Currently Amended) ~~In-situ~~The in-situ testing apparatus ~~for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes~~ according to claim 12, ~~which is equipped with the~~further comprising pore water pressure gauge that possesses a sensor unit on the surface of the inflatable membrane of the central cell.

14. (Currently Amended) ~~In-situ~~An in-situ testing apparatus for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes, ~~in which the~~comprising a monitoring ~~zoned~~zonde lowered down into the bore-hole, ~~is composed of~~said monitoring zonde comprising multiple cells that have independent pressure rooms, ~~and~~with each independent cell ~~is~~being designed to apply ~~the~~ loading to ~~the~~a corresponding soil layer by controlling the pressure carried by ~~the~~a liquid medium in the pressure room, and each cell is independent and ~~the~~ connections ~~of~~between the cells are exchangeable.

15. (Currently Amended) ~~In-situ~~The in-situ testing apparatus ~~for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes~~ according to claim 14, wherein each cell is composed of a cell body itself, a cylindrical membrane attached to the circumference of the cell body, and ~~the~~a pressure room filled with a liquid medium located between the cell body and the membrane.

16. (Currently Amended) ~~In-situ~~The in-situ testing apparatus ~~for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes~~ according to claim 15, ~~wherein~~further comprising seal plates ~~are~~ inserted ~~in~~ between the cells, so that the membranes of the adjacent cells can be intimately connected with each other.

17. (Currently Amended) ~~In-situ~~The in-situ testing apparatus ~~for the evaluation of liquefaction and dynamic characteristics of soils using bore-holes~~ according to claim 11, ~~which is equipped with the following units, i.e.~~ further comprising a cylinder that generates ~~the~~ pressure carried by the liquid medium in the pressure room, ~~the~~a monitoring unit for measuring ~~the~~ movement of ~~the~~a rod connected to the cylinder ~~rod~~, and ~~the~~a unit for deriving ~~the~~ displacement of the bore-hole wall from the measurement of the movement of the cylinder rod.